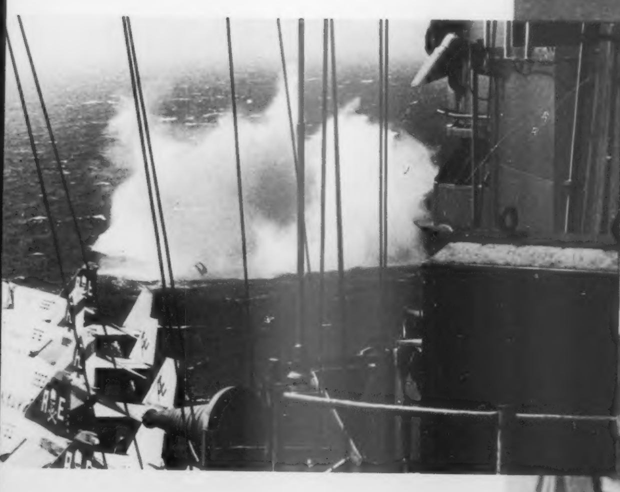
A Naval Safety Center Publication

approach

MARCH 1973 THE NAVAL AVIATION SAFETY REVIEW



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CORSAIR LAUNCH TRIM

AN A-7B pilot launched from a CVA as wingman on a section strafing mission, and at the end of the flight, the tower informed all aircraft that the A-7s would be "running the deck." The *Corsair II* pilot entered the break and flew a standard VFR pattern.

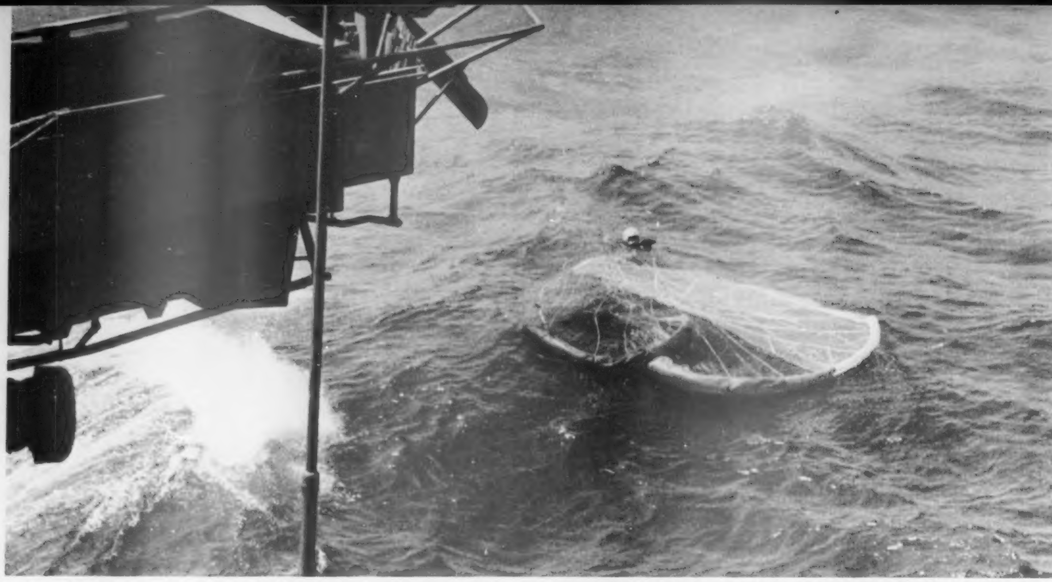
His first approach resulted in a fouled deck waveoff followed by a normal arrested landing on the second pass. The aircraft was taxied forward and spotted behind the port cat where the pilot went through his takeoff checklist.

The ensuing catapult launch appeared normal to observers. However, the aircraft departed the ship in a flat attitude. The aircraft settled somewhat off the bow, seemed to pitch up, then went nose-down. Simultaneously, as the nose dropped, the pilot ejected. The seat cleared the aircraft just prior to water impact (see photos). The ejection was normal, other than hurried, and the pilot was rescued by the plane guard helo – unharmed. The aircraft broke up on impact and sank.

Aircraft malfunction or material failure was considered by the **Board,** but rejected as unlikely. Investigation revealed that the scheduled flight was conducted as briefed and was in accordance with NATOPS and squadron procedures. Pilot deviation from these procedures, however, was noted. While "running the deck," the pilot used 25 degrees of trailing edge flaps and 3 degrees nose-up trim. These settings are normally used by the squadron (although they do not agree with NATOPS) for catapult launches with gross weights of 30,000 lbs and above. For the gross weight of the aircraft in question (24,000 lbs), squadron policy calls for full flaps and 5 degrees nose-up trim.

Although NATOPS does not specifically state a flap setting, it does provide guidelines for trim settings to be used with various flap settings at various excess end-speeds. At full flaps, it calls for 4 degrees nose-up trim; and for 25 degrees of trailing edge flaps, it calls for 8 degrees nose-up trim for end-speed excesses of 16-25 knots. Aircraft Launching Bulletin No. 0-63 states that 25 degrees of flaps should be used at or above 30,000 lbs to improve acceleration after leaving the bow. The trim settings required in this bulletin are the same as NATOPS.

Although it was accepted squadron policy (at the time of the mishap) to use full flaps and 5 degrees nose-up trim for catapult launches of aircraft of less than 30,000 lbs gross weight, it was not so stated in any



squadron publication. Neither were the procedures for "running the deck" covered in any squadron publication. According to the mishap board, however, the procedures were well-known by the majority of pilots because they were briefed extensively during the squadron "work-up" phase. Unfortunately, the pilot in question joined the squadron only a few days prior to the cruise and was apparently never briefed on "running the deck."

The mishap board offered the following as the most probable explanation of the accident:

"The pilot, after having received approximately 70 catapult launches of various gross weights from 30-38,000 lbs, was receiving his first lightweight (24,000 lb) catapult launch of the cruise. He was not mentally prepared for the relative difference of the launch.

"As the aircraft left the bow, the 25 degrees of flaps and 3 degrees nose-up trim caused the aircraft to leave the bow in a relatively flat attitude. Pilot technique may also have been a factor in producing the flat attitude. Additionally, these same settings caused the nose to feel 'heavy' and respond to control inputs more slowly. By this time, the attitude and sluggishness of the aircraft convinced the pilot something was wrong; and this, coupled with his low altitude, made him decide to eject.

"By the time the nose started to respond, the pilot had mentally initiated ejection and was physically reaching for the lower ejection handle. He tried twice to grasp this handle and, in the meantime, probably forgot to fly the airplane. With the flaps and trim settings still producing a heavy nose, the aircraft began to settle from its nose-up attitude. The pilot then removed his hand from the stick, looked for the lower ejection handle, and used both hands to pull the handle. The plane continued to nose over and impacted the water.

"From the pilot's statements, it is obvious that he was flying the aircraft by 'feel' from the time he saluted until he ejected. While this technique is an accepted and valuable addition to a pilot's flying skills, it is not something to be used to the exclusion of all other information available to the pilot. Basic flying techniques, particularly those involving catapult launches, should provide the pilot with rapid and reliable information. While the Board does not question the decision to eject once the pilot decided the aircraft was not flying properly, it does question the completeness of the information on which that decision was made."

Among other things, the mishap board recommended that NATOPS more thoroughly address the problem of flap and trim settings for all catapult launches. The air wing commander commented on the fact that squadron SOP differs from NATOPS and noted that this difference should be resolved. He tasked the squadron CO with originating correspondence recommending evaluation of trim versus flap settings.

The type commander's endorsement stated, in part:

"The A-7 NATOPS manual specified 8 degrees nose-up trim for 25-degree flap settings. This trim setting was determined as the result of actual flight test data. Had the pilot selected 8 degrees nose-up trim, the aircraft would most probably have assumed a climbing attitude enhancing control authority. Squadron SOP is in direct conflict with A-7 NATOPS by specifying 3 degrees nose-up trim for 25-degree flap settings. Therefore, supervisory error at the command level is considered to be a cause factor in this accident. The squadron commanding officer is directed to review squadron SOP to ensure compliance with NATOPS." ◄

What Do You Propose?

WHY is it that when some squadrons deploy aboard USS Boat, they often incur one hair-raising (pulling?) incident after another. Once the cycle begins, the proverbial black cloud seems to hover overhead like a dipping helicopter on a hot contact. The incidents/ground accidents which unfold are typical.

A ground handling crew using an MD-3A tow tractor was pushing an SH-3D up an incline at the hangar deck fire doors – with the tow bar attached to the tail landing gear. As the aircraft's MLG started up the incline, the helo nosed forward compressing the MLG struts. This raised the tail and extended the tail gear strut. With the tail shock fully extended, the tractor continued pushing forcing the strut out of the strut housing. As the shock strut separated, the yoke arm continued its forward travel, going overcenter just prior to the aircraft collapsing on its tail.

The tailwheel and yoke arm punctured the underside of the fuselage. About 350 manhours and 14 working days were estimated to repair the damage.

The ground accident report assigned supervisory error. It stated that the tow tractor should have been hooked up to the MLG and the helicopter *pulled* up the incline. The ground handling crew advised that the attempt which ended in damage was their second attempt. After the first one failed, they "succeeded" the second time by *backing off 8 to 10 feet for a running start.*

This was the *fourth ground accident* for the squadron *in less than a month,* and during the same period, there had been *five other minor ground handling crunches.* The two main causes for ALL of these were inadequate supervision and inadequate training.

The experience of this squadron was a skosh unusual. Thankfully, most squadrons fare better. Moving aircraft aboard ship is certainly more difficult than moving them on concrete, due to deck motion, space limitations, time factors and other impediments to safe operations. There are, however, ways of reducing shipboard ground accidents and crunches.

Let's look beyond all of the standard preachments, to industry. A method used there to attack certain problems is known as the think tank. This method poses a question and permits the ideas and imagination of knowledgeable persons to flow freely for evaluation.

So now you are a member of a think tank operation. Ask the question anew, "Why is the rate of shipboard ground accidents and crunches so high?" What do you propose as a solution to the problem?

Here's what we'll do at NAVSAFECEN. We'll compile all responses to the questions in two categories (ship and squadron), wait a reasonable time for replies, and publish in a Spring issue your thoughts, ideas, and suggestions. Sign your name if you choose, but we do want your rank or rate and your primary duty assignment. You may answer by letter, postcard, or Anymouse form. Send replies to Editor, APPROACH, NAVSAFECEN, NAS, Norfolk, Va. 23511.

DISTRACTION and REACTION

When in doubt — wave off.

A TF-9J pilot was making night touch-and-go landings at Homefield following a formation training flight. Turning downwind for the second bounce, the pilot took proper interval on the aircraft ahead. At the time, these were the only two aircraft in the VFR pattern.

As the pilot neared a deep 90-degree position on an approach to the left parallel runway, he noticed traffic at his 12 o'clock position which he believed to be a single aircraft. In reality, it was a section of F-9s making a GCA to the right parallel runway. The pilot could not distinguish the type aircraft.

Calling the "ball," the pilot continued his approach, all the time becoming more concerned about the traffic which had appeared. After passing the 45-degree position, the F-9 driver believed a midair was imminent.

At this moment, the section of aircraft on GCA approached minimums. The lead executed a missed approach, while the wingman continued for a touch-and-go to the right parallel runway. This splitting of the section made it appear to the F-9 pilot that he was extremely close to the 12 o'clock traffic.

The evasive action taken at this point is uncertain, but investigators believe the pilot became disoriented because of the GCA traffic. The pilot told the flight surgeon, who examined him a few minutes after the crash, that he retarded the throttle and pulled back on the stick to avoid a collision. When the pilot returned his attention to his own aircraft, he discovered he was in a near stall condition on short final. Adding full power, he leveled his wings and continued the approach.

At this point, estimated to be below 100 feet AGL, the additional power failed to stop his sink rate. He settled into mesquite trees in a landing attitude, approximately 3000 feet short of the runway threshold. Upon impact, he tried to eject, but couldn't find the face curtain. He considered using the lower ejection handle, but by then he was unsure of his attitude and decided to ride it out. He "taxied" 480 feet, at high power, through mesquite trees until striking a 33-inch diameter metal pipe (see photo) which sheared all three landing gear.

The aircraft continued another 330 feet through dense mesquite. It came to rest, heavily damaged but

intact, with the engine still running. The pilot secured the engine and essential switches and attempted to blow the canopy. The emergency canopy release was not properly activated, and it didn't blow. Opening the canopy manually, he exited the aircraft uninjured. A helo picked him up a short time later.

The mishap board concluded, in part, that the pilot became preoccupied with other aircraft in the pattern to the extent that he allowed his aircraft to enter a flight condition from which safe recovery could not be effected.

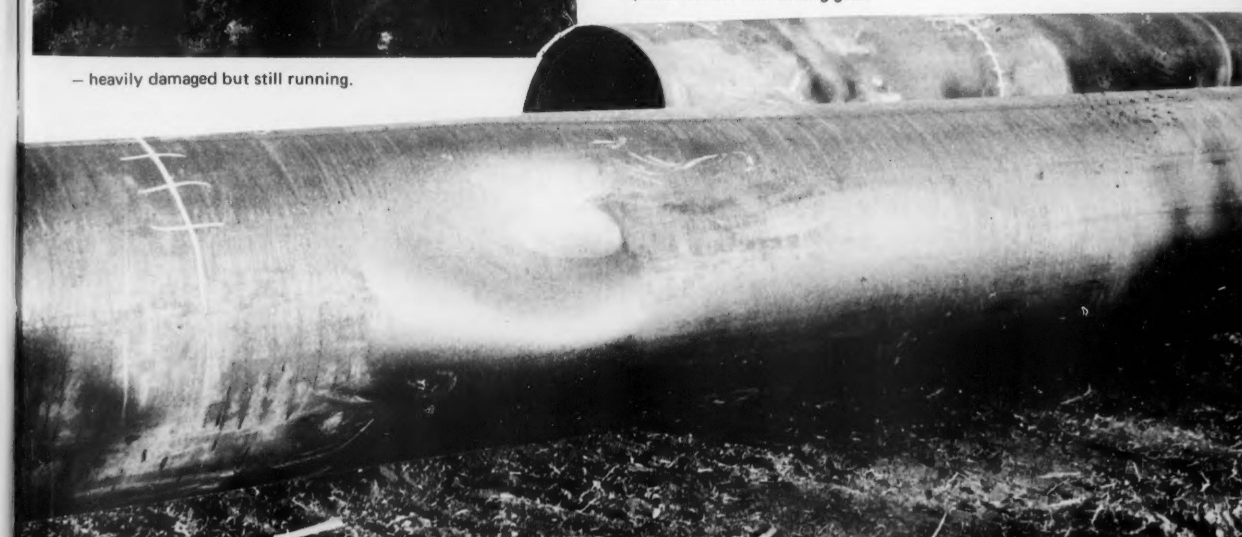
An endorser to the mishap report stated:

"This mishap is an example of a pilot factor accident that should not have occurred. An inexperienced pilot found himself in a situation where even an experienced pilot could envision a midair collision. His reaction was to pull the nose up and take off power instead of leveling his wings, adding power, and climbing out to set up for a second approach. After he recognized his *in extremis* situation, his recovery technique was correct, but too late to keep the aircraft from impacting the ground."

(Also, Tower was at fault for not advising the pilot of GCA traffic. – Ed.)

– heavily damaged but still running.

Pipes broke off the landing gear.



Young studs and old fuds ponder a prophecy of disaster as foretold by . . .

The Sage of Doom

By Fred Bernstein

THERE was no need for a calculated risk – there seldom is – the "statistics" told a glowing story; ahead on commitments by "umpteen" percent notwithstanding the attendant shortages of men, money, and material and we had just passed our 30th accident-free month. The weather and its future were just not suitable for flying – what to do? Like any other forthright and well-organized squadron, we'll schedule an all pilots meeting. Great – a chance for a few sea stories, the heads of departments can air their pet theories, and the safety officer will warn us and counsel us on the dire consequences of an error in flight.

But behold, with the help of modern math – taught by his third grade son – a skeptic in our midst foretells of doom.

"Statistically," this mystic says, "we are bound to have an accident soon."

Rising from his chair and standing squarely in front of the group, he reiterates his *magnum opus*.

"Look, flying has had, and will always have accidents. The more you fly, the greater the possibility of having an accident. Stop flying and you will stop aircraft accidents; continue to fly and you will continue to have accidents."

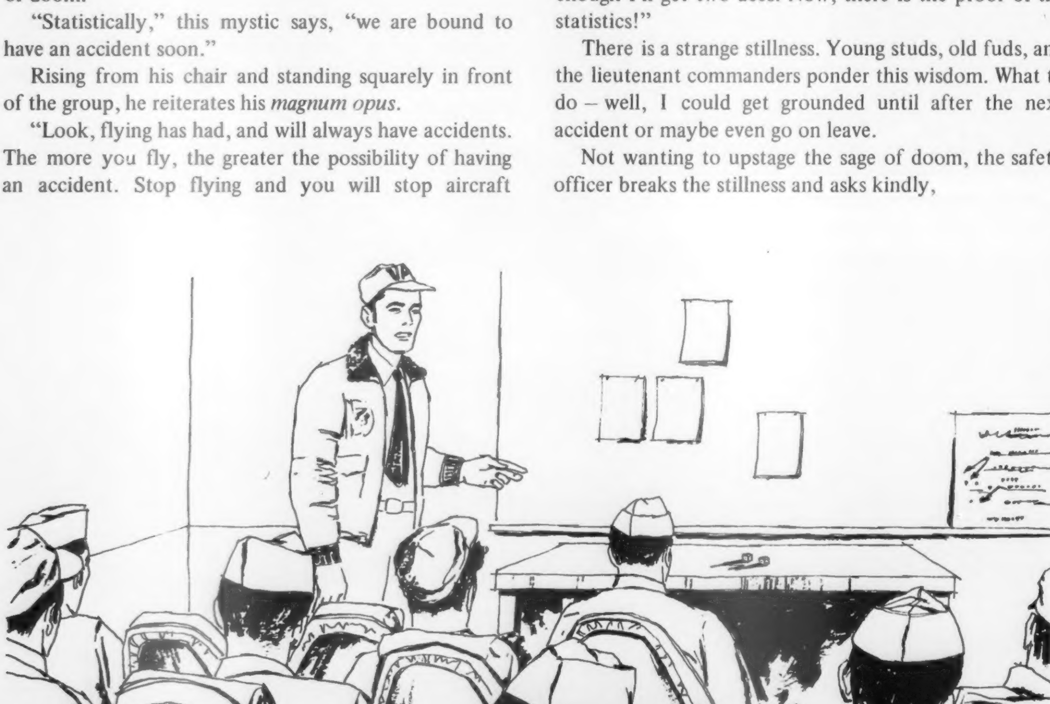
Bedlam destroys the calm of a "nice" foul weather day, coffee cups tumble, some smokers butt their cigarettes, and the nervous debaters light up. The moment of truth is dawning. Can you argue with statistics, can numbers – those magic-like symbols – be wrong?

Undisturbed, and with the confidence of a scientist, our speaker picks the Acey-Deucey dice off the SDO's desk and prepares to demonstrate his thesis.

"Let's assume these dice are analogous to flight operations and that the combination of two aces means an accident. We all know that if I keep rolling often enough I'll get two aces. Now, there is the proof of the statistics!"

There is a strange stillness. Young studs, old fuds, and the lieutenant commanders ponder this wisdom. What to do – well, I could get grounded until after the next accident or maybe even go on leave.

Not wanting to upstage the sage of doom, the safety officer breaks the stillness and asks kindly,



"Can you, with the help of statistics, tell us on what day or perhaps, even better, what hour this accident will occur?"

"No," says our statistical friend, "but it's bound to happen soon. We are long overdue."

"Can you," asks our safety officer, "tell us what will cause the next accident?"

"No, not exactly, but it will most probably be pilot error, maintenance error, or supervisory error and in that order of probability. Statistics guarantee that."

"Then," says the safety officer, "you will admit that accidents have a cause, and the most frequent cause is the pilot."

"Well, yes, I suppose so, but it's related to the inability of the pilot to do right all the time, which means there is a statistical probability that error will occur and an accident will result."

"Can we," our safety officer continues, "conclude that statistics tell us that accidents will occur and they will have a cause? These are statistical truths; is this so?"

"Hold on now! Don't be twisting my words; statistics prove you can't eliminate accidents. Why, look at the resources that have been pumped into any number of safety programs. Let's face it, the statistical probability of an accident is a fact indisputable since Orville and Wilbur decided to go flying."

Departing from the historical tidbit, our safety officer pleads,

"Granted, statistics are a record of what has happened, and they certainly testify to the fallibility of men and machines; however, statistics cannot cause, nor has a statistic ever been responsible for, an accident. You and I and every officer and man in this squadron can cause an accident. Why, we even get help from AMD, NARF, the airplane builder, and our friends next door."

"That's exactly what I'm saying; the odds are against a perfect safety record. Every time we strap on a bird, we take a chance; and as long as the odds are against a perfect safety record, we will have an accident; statistically . . . "

"No," our safety officer interrupts. "Every time we go flying, we have an *opportunity* to perform with or without an accident. If we ignored training, the need for

maturity and supervision, we would undoubtedly perform poorly. Aviation safety programs and the entire effort of our maintenance program is to give every pilot the *opportunity* to perform competently, efficiently, and safely. Flying is not inherently a risk or chance situation. People – pilots, maintenance personnel, manufacturers and designers – cause accidents through their inability to take the *opportunity* to perform in such a fashion as to preclude an accident. Accident statistics are nothing more than a tool to illustrate what has happened in the past. They offer no power or promise for the future. Each successful flight adds to the watershed of knowledge which can further the opportunity to fly without an accident. Odds are related to games of chance; we are certainly not rolling dice or tossing coins when we fly."

The Socratic exchange is interrupted by the entry of the training officer who exclaims:

"The field will be marginal VFR in about 5 minutes; there's a good hole about 5 miles wide over the water. Let's get everything out, but keep a sharp lookout for other aircraft. We won't build up our flight time sitting around telling lies to each other."

As the readyroom empties, the squadron jester adds: "Like he said, here's an opportunity."

From the files of APPROACH

...about our cover

A SPECIAL model of the commercial DC-9F convertible passenger-freighter jetliner, the C-9B, will soon join the Fleet. Several were ordered last April to fulfill the Navy's requirement for a fast-reacting logistics aircraft to support fleet units around the world. The aircraft is a sister to the USAF C-9A *Nightingale* aeromedical airlift transport.

Dimensions of the C-9B match those of both the commercial DC-9, series 30, and the C-9A version. The aircraft is 119.3 feet long, with a 93.4-foot wingspan, and a tail height of 27.4 feet. Maximum takeoff gross weight is 110,000 lbs. Power is provided by two Pratt and Whitney JT8D-9 engines, each rated at 14,500 lbs thrust at sea level.

For Navy service, the C-9 is fitted with fuselage fuel tanks to supplement standard wing tanks. Total fuel capacity is boosted to 5929 gallons, compared with 3679 gallons in commercial versions. With the added fuel, C-9B range (with a 10,000 lb payload) is extended to 3000 nautical miles.

Interior arrangement of the new twin-jets will provide for up to 90 passengers in five-abreast seating, or a mixed load of 45 passengers in the aft section with space for three 88 x 108-inch cargo pallets forward.

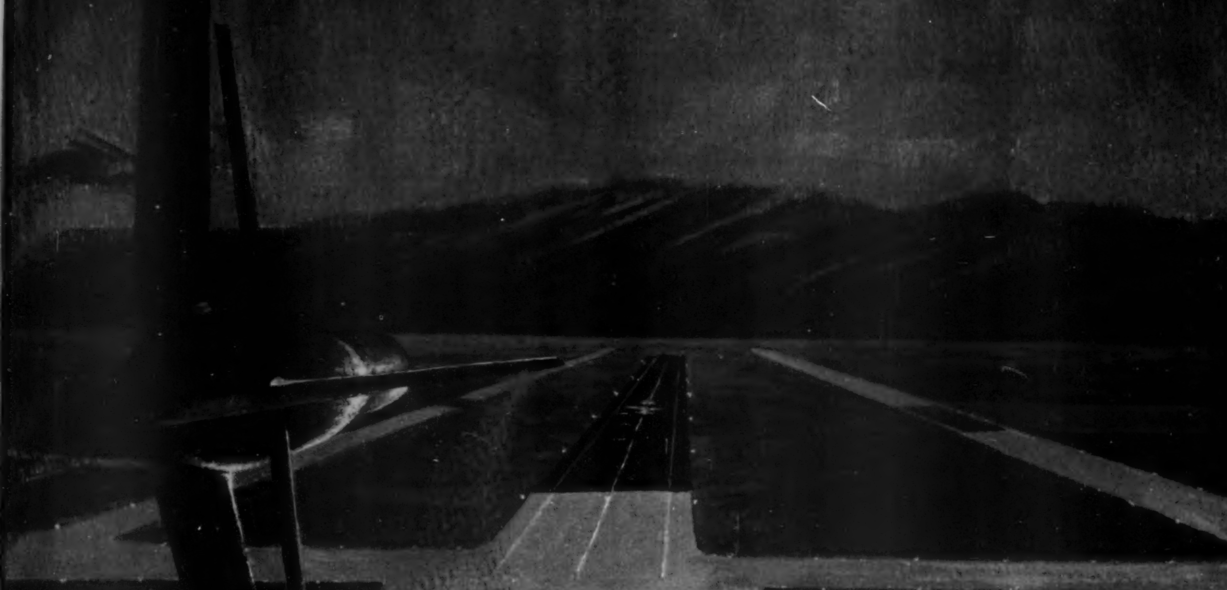
In the all-cargo configuration, the main cabin has ample space for large loads such as three complete F-14 TF-30 jet engines, or as many as eight TF-30s mounted on special shipping platforms minus afterburners. Main deck cargo loading is accomplished through a large door installed on the left side of the fuselage just aft of the forward passenger door.

As part of its contract to build C-9s for the Navy, McDonnell Douglas will provide complete base supply support for the aircraft through the company's product support organization. Contractor personnel will be assigned at C-9B operational headquarters to furnish 24-hour, 7-day spare parts service in support of Navy maintenance crews.

The first two C-9s will be accepted by the Navy during ceremonies at Long Beach in May. Of the two, one goes to VR-1, the other to VR-30. Each squadron will eventually have four C-9s.

The hazards of trailing vortices have been well-publicized in the past, including thorough coverage in the February 1971 APPROACH. This article lays it on again. Why? See for yourself . . .

Caution: Wake Turbulence!



A T-28B *Trojan* was on a night GCA to Homefield. Upon intercepting glide path, flaps were lowered to one-fourth. At 3 to 4 miles from touchdown, clearance was received to land No. 2 behind an E-2 on short final. The pilot's first attempt to sight the E-2 was fruitless. When he did see it, moments later, the pilot felt his interval was too close and reduced power to provide more separation.

Approaching the landing threshold, the *Trojan* pilot encountered violent wake turbulence. This happened at about the same time the pilot decided to go around. His aircraft rolled right to nearly 90 degrees of bank, nose-high. The pilot applied full power, left aileron, and, unaccountably, right rudder. The aircraft began to respond, but altitude was insufficient to permit full recovery. The pilot did manage to get the landing gear up before impact.

The T-28 struck the ground in a wings level, nose-high

attitude, in a stall or a near-stalled condition. It slid wings level, about 375 feet in a straight line. After the aircraft stopped, the pilot and crewman (in the rear seat) exited the aircraft, uninjured.

Wake Turbulence

For many years, the turbulence generated by aircraft in flight was attributed to "propwash/jetwash." Pilots, in making maneuvers such as steep 360-degree turns, would occasionally get caught in their own "wash." The disturbed air behind aircraft caused some pretty rough rides, unplanned waveoffs, and a considerable number of accidents. This phenomenon, "propwash/jetwash," has since become better understood and is now classified in two categories – "thrust stream turbulence" and "wingtip vortices."

Thrust stream turbulence is caused by high-velocity air from the propeller blades of a prop aircraft or from the exhaust of a jet aircraft. It is of primary concern during ground operations, but it should not be a hazard to aircraft in flight, except possibly in close formation, at low altitudes, during takeoffs or landings in the vicinity of an aircraft making a ground runup, or to helicopters operating at low altitudes. For further reading on the hazards of thrust stream turbulence, refer to the following APPROACH articles:

- "C-5A Exhaust Velocity" in the Oct 1970 issue.
- "The Big Blow" and "Beware Jet/Prop Blasts" in the Sept 1970 issue.

Wingtip vortices, on the other hand, are generated during flight and cause the turbulence that is commonly referred to as "wake turbulence."

Vortex Generation

Lift is generated by creating a pressure differential over the wing surfaces. The lowest pressure is found near the center of the upper surface. This tends to draw the airflow over the top of the wing inward from the tip toward the fuselage. Similarly, the highest relative pressure, found near the center of the lower surface, makes the airflow under the wing bend outward toward the tip in an effort to equalize the pressure. The resulting circulation and the downwash effect of the airflow over the wing causes the air leaving each trailing edge to form a vortex sheet which rolls itself up into a swirling spiral of air behind the wingtips. After the rollup is completed, the wake consists of two counter-rotating vortices. On modern, sweptwing aircraft, the rollup process is well underway even before the flow leaves the wingtips. (See Fig. 1.)

Vortex Strength

The strength of the vortex is governed primarily by the weight, speed, and shape of the wing of the

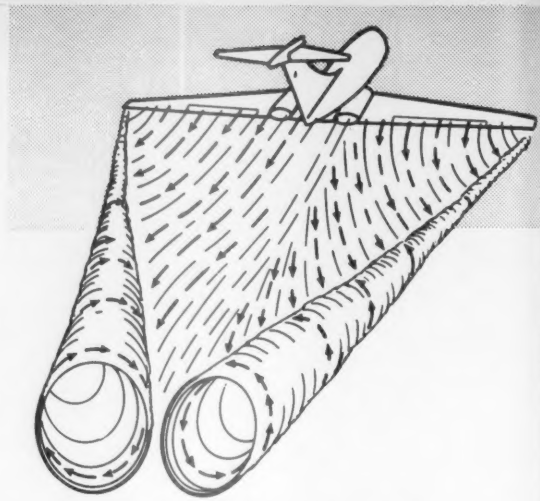


Fig. 1. The rolling-up process.

generating aircraft. Vortex characteristics of any given aircraft can also be changed by extension of flaps or other wing-configuring devices. The basic governing factor, however, is weight, and the vortex strength increases with an increase in weight and span loading. During a recent test, vortex tangential velocities were recorded at 150 feet per second, or about 90 knots. The greatest vortex strength occurs when the generating aircraft is *heavy, clean,* and *slow* (in the landing pattern).

Induced Roll

A serious wake encounter can result in structural damage. The primary hazard, however, is loss of control because of induced roll. During flight tests, aircraft intentionally flown directly into the core of a vortex tended to roll with that vortex. The capability of counter-controlling this roll depends on the span and responsiveness of the encountering aircraft.

Where the wingspan and ailerons of a larger aircraft extend beyond the vortex, counter-control is usually effective, and the induced roll is minimal. If the ailerons of a shortspan aircraft were wholly within the vortex, its counter-control effectiveness would be drastically reduced. If the vortex strength exceeds the counter-control capability of the "victim" aircraft, the induced roll cannot be stopped. The significant factor in induced roll is the *relative span* of the encountering aircraft. Pilots of shortspan aircraft must be especially alert to vortex situations, *regardless of aircraft performance capability.*

Vortex Characteristics

Trailing vortex wakes have certain characteristics which a pilot can use in visualizing the location and

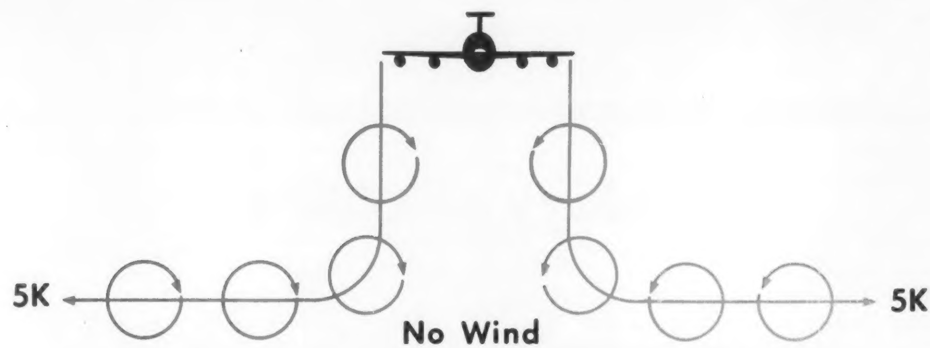
avoiding it.

(a) Vortex generation starts with rotation when the nosewheel lifts off during takeoff and ends when the nosewheel touches down on landing. Pilots should note the rotation or touchdown point of the preceding aircraft and plan the landing or takeoff so as to touch down or lift off in the area free of vortices.

(b) Vortex circulation is outward, upward, and around the wingtip when viewed either from ahead or behind the aircraft (Fig. 1). Tests with heavy aircraft have shown that the diameter of the vortex core ranges from 25 to 50 feet, but the field of influence is larger. The vortices stay close together (about three-fourths of the wingspan) until dissipation or until they are influenced by ground contact. In view of this, if persistent vortex turbulence is encountered, a slight lateral change in flightpath will usually avoid it.

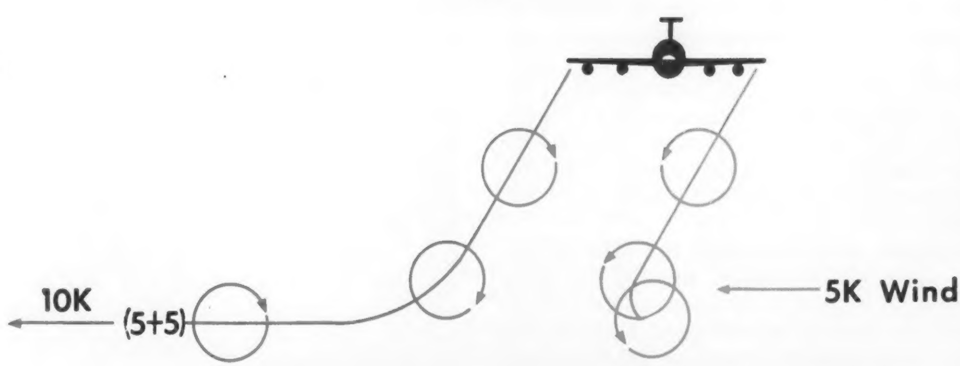
(c) Flight tests have shown that the vortices from heavy jets start to sink immediately at about 400 to 500 feet per minute. They tend to level off about 800 to 900 feet below the generator's flightpath. Vortex strength diminishes with time and distance behind the generating aircraft. Atmospheric turbulence hastens the breakup. Residual choppiness remains after vortex breakup. Pilots should fly at or above the heavy jet's flightpath, altering course as necessary to avoid the area behind and below the generating aircraft.

(d) When the vortices sink into ground effect, they tend to move laterally outward over the ground at a speed of about 5 knots (see Fig. 2). A crosswind component *will decrease the lateral movement of the upwind vortex* and increase the movement of the downwind vortex (see Fig. 3). This may result in the upwind vortex remaining in the touchdown zone or



Vortex Movement in Ground Effect - No Wind

Fig. 2



Vortex Movement in Ground Effect with Cross Wind

Fig. 3

hasten the drift of the downwind vortex toward a parallel runway. Similarly, a tailwind condition can move the vortices of an aircraft which has just landed into the touchdown zone.

Avoiding Wake Turbulence

Avoid encounters below and behind the generating aircraft, especially at low altitude where even a momentary wake encounter could be disastrous. Pilots (and control tower personnel as well) should be particularly alert to calm wind conditions and situations where the vortices:

(a) Remain in the touchdown zone.

(b) Drift downwind to a parallel runway.

(c) Sink into takeoff or landing path of a crossing runway.

(d) Sink into traffic patterns of other airports.

(e) Sink into the flightpath of VFR flights operating at the hemispheric altitude 500 feet below.

Pilots should visualize the location of the vortex trail and use proper vortex avoidance procedures to achieve safe operation in a mixed-traffic environment. It is equally important that pilots of medium and large aircraft plan or adjust their flightpaths to minimize vortex exposure to other aircraft.

Under certain conditions, airport traffic controllers apply procedures for separating other aircraft from large and heavy turbojets. They will also provide advisories to VFR aircraft with whom they are in communication and which, in their opinion, may be adversely affected by potential wake turbulence from a heavy jet. Usually they will give position, altitude, and direction of flight of the heavy jet, followed by the phrase "Caution – wake turbulence." Whether a warning is given or not, however, a pilot is expected to adjust his operations and flightpath as necessary to preclude serious wake encounters.

Adapted from FAA Advisory Circular 90-23C

Etiology of a Midair

THE DAY had been long and tiring. The flight leader called the tower on the way home and requested permission for a flyby: "Always good for morale," he thought. The five slicks locked in echelon right. Before reaching the end of the runway, Chuck 4 collided with Chuck 3. The results included four fatalities and two postcrash fires.

One of the major factors was an attitude of overconfidence, with subsequent carelessness on the part of the pilot of Chuck 4. He was one of the most experienced aviators in the unit, with more than 1500 hours in helicopters and 1336 hours during his current 11-month tour. He had no previous accidents. He considered himself an exceptionally capable aviator and undoubtedly took great pride in his flying record and prowess.

His platoon leaders and others had noted he was rather resistant to suggestions regarding his flying techniques and habits. On several occasions he had been admonished for flying too close during formation. On the day of the accident, he had been told twice, once earlier in the day and again just prior to the accident, that he was flying unusually close.

The *esprit de corps* of the unit was high, and the encouragement of the flight leader to "close it up and look real good" probably caused the pilots to close tighter than usual. In fact, most of the aviators and crewmembers interviewed remarked that it was one of the tightest formations they had experienced.

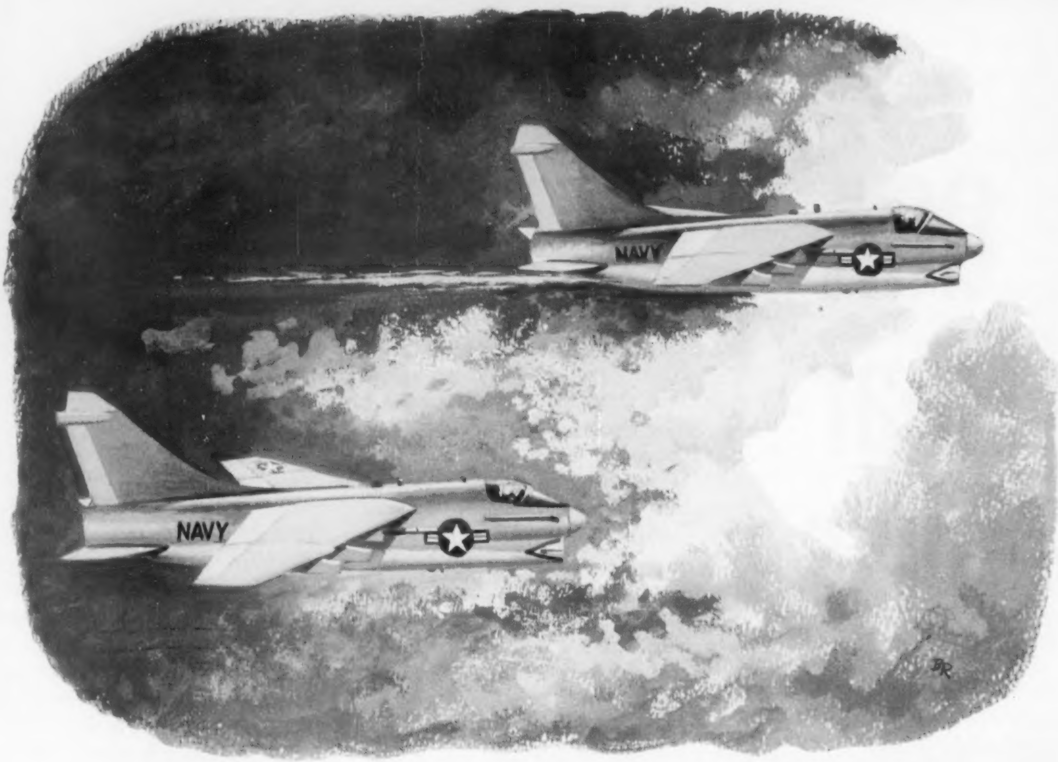
In this accident, an aviator had a desire to impress someone by demonstrating his flying skills. All he demonstrated was lack of professionalism, lack of self-discipline, lack of good judgment, and immaturity.

Unfortunately, the rest of the crew can't get out and walk when the pilot programs himself for destruction. All too often, the crew pays for the pilot's poor judgment. When a pilot causes the death of a crewman because of a childish desire to demonstrate his flying skill, what does he think about when he looks at himself in the mirror? Ask yourself that question the next time you want to impress someone with your flying skill. Demonstrate your flying skill by making certain your crew and aircraft arrive safely after each mission. That takes professional skill.

U.S. Army Aviation Digest
December 1972

Bravo Zulu

LT Dennis B. Gillease, VA-155



LT Dennis B. Gillease was flying an A-7B off ORISKANY over Southeast Asia. He had made a 45-degree strafing attack on supplies along the beach in North Vietnam and had just recovered from his dive. Approximately 10 seconds later, while climbing out, he heard a sharp "bang" from the engine and felt vibrations similar to those made by operation of the EPP.

LT Gillease, now at 11,000 feet, turned toward home. During the return trip, he experienced severe compressor stalls, accompanied by fire from the tailpipe at power settings above 84 percent. During the stalls, the engine TIT would rise from 889 to 1050 degrees, and fuel flow would vary between 2200 and 2800 PPH. All other instruments remained steady, and no caution lights were observed. He found that the engine ran smoothly below 84 percent RPM, but at reduced thrust, and he was unable to maintain level flight.

His wingman observed fuel streaming from the area of tailhook attachment. Selection of bleeds and manual fuel had no noticeable effect on engine performance.

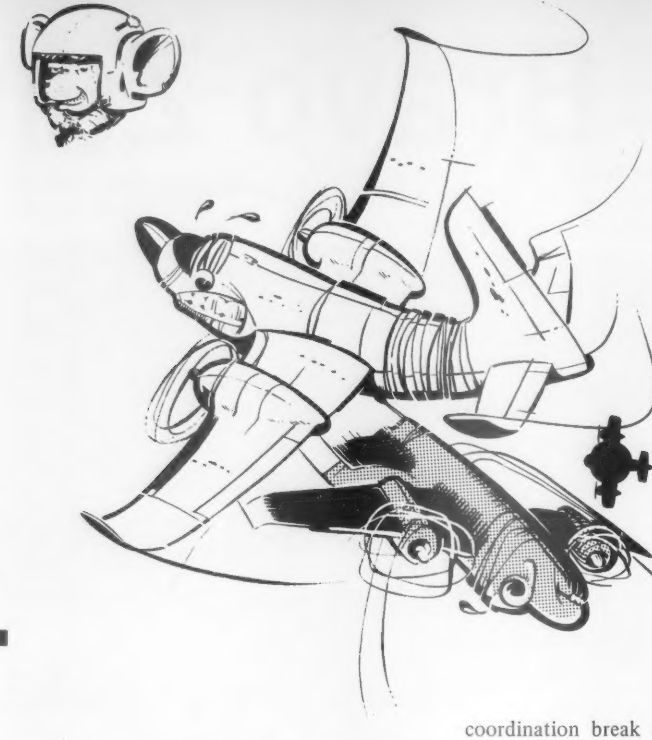
Setting power below 84 percent, LT Gillease returned to ORISKANY in a gradual descent (300-500 FPM) with bleeds selected and the engine fuel selector in MANUAL. At 10 miles, he blew his gear down and made a straight-in, flaps-up approach, to a successful barricade arrestment.

The suspected cause of the engine problem was "FOD" caused by direct enemy action.

LT Gillease is commended for his highly professional action in cooly assessing the problem and safely landing the aircraft under the most trying circumstances.

Well done!

Anymouse



GCA Near-miss

TWO of us VR types from Centerville had made an IFR flight to NAS Watertown and were on an actual GCA. Our flight, in a trusty C-131, was a VIP pickup for a Code 5 and party.

We were in and out of the goo on final, with occasional small corrections to remain on centerline.

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. These reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

REPORT AN INCIDENT, PREVENT AN ACCIDENT

SUDDENLY, the controller announced a target at 12 o'clock, opposite direction, closing, at half a mile. The copilot simultaneously spotted an S-2 dead ahead. At this time, we were at the bottom of a ragged overcast, viz about 2 miles. The runway was not in sight.

When we saw the S-2, it was turning right; but we went full bore into an emergency right climbing turn. We missed. Maybe, because we had all our lights on, the S-2 saw us before we saw him. I don't know.

When we reported our action, would you believe GCA said, "Remain VFR." Impossible! So there we were – on the gages, in controlled airspace, without a clearance, and in a high-density area yet. Well, the next time around was routine, and we made an uneventful landing.

It beats me how there could have been anything but IFR traffic at that time. Also, how could coordination break down between the tower, GCA, and approach control?

Near-missmouses

Your Anymouse almost (but not quite) arrived in time for us to reach Watertown to check the tapes. It did, however, arrive soon enough so that the near-miss and some of the details were still fresh in everyone's mind. We can reconstruct most of the incident. Here's how:

- *There were two "S-2 types" in the area – a C-1A which had you boresighted and an E-1B over touchdown ahead of you.*
- *GCA was working you and the E-1. The tower was working the C-1.*
- *The tower "forgot" about you on GCA final and cleared the C-1 to land after the E-1. The C-1 was in a turn (fortunately) and his wing blocked him from seeing you. The tower had not reported the GCA traffic (your C-131) to the C-1.*

There are details about who was where, at what time, at what altitude, and what heading that we cannot reconstruct positively. But it was, **to say the least**, *an unsat situation. The tower controller has since been relieved and is undergoing retraining and requalification.*

Communications Gap

OUR C-130 departed NAS Eastcoast for local pilot training. Maintenance requested an inflight ILS check, so the instructor went to Nearby AFB (about 75 miles away). The weather was clear with a little haze. On the way, the instructor and student discussed the approach and how they could expect to be vectored by approach control.

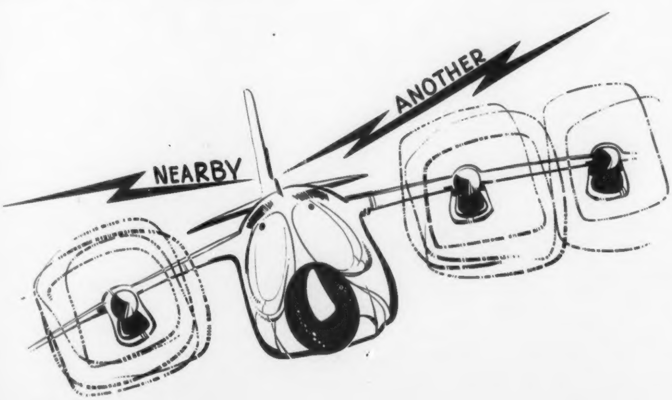
About 35 miles from Nearby TACAN, the AC (aircraft commander) called, "Nearby Approach, this is Navy 12345, 35 out on the 220 radial, requesting ILS to low approach." Approach replied, "Roger, Navy 12345, squawk 0500 and IDENT. Say type aircraft." The AC rogered and informed Approach it was a C-130.

A few minutes later, Approach called, "Navy 12345, say your position from the TACAN and IDENT again, please." The AC responded that we were 20 miles out on the 220 radial, heading for the outer marker. Approach replied, "We still don't have you. Request you remain clear of the TCA until we establish radar contact." The aircraft commander rogered and then thought to himself, there's no TCA around Nearby AFB . . . *click* . . . but there sure is one at Another AFB about 50 miles south!

The aircraft commander then called, "*Nearby* Approach, this is Navy 12345 . . . " to which they exclaimed, "Nearby? This is *Another Approach!*" The aircraft commander commented that this frequency is the published frequency for Nearby. Another Approach acknowledged, "Roger, we share the same frequency, and they should be on it." But, they weren't, so we bid adieu to Another and got Nearby Approach on a different frequency. We shot the approach and completed the hop with no further incidents.

This would not be classified as a big deal, but it does point up that "Approach," "*the* TACAN," "*the* ILS," "*the* outer marker," etc., are not as individual or as specific as they might seem. Pilot familiarization with facilities and frequencies in the area and being specific about controller understanding or attention could save the day.

Herkymouse



Whew! Add a few "what ifs," such as, marginal weather, west coast terrain (i.e., "cumulo granite"), and "first time" AFB, and the odds for a tragedy increase dramatically.

A quick check with the Air Force and we discover that the "common" approach frequency concept which contributed to this potential "near-miss" is being phased out. However, close examination of the incident reveals several items that deserve further comment. Certainly the pilot's familiarity with the TCA was commendable, but the entire episode might have been averted with positive adherence to proper radio communications procedures. Ever increasing traffic congestion demands increased attention to proper use of call signs – both in transmission and reception. Communications that demand proper identification and take nothing for granted can spare great embarrassment if not danger. To assist in avoiding confusion in these areas, it is highly recommended that pilots always positively identify the NAVAID when reporting their position to a controller. Again, it all goes back to that old word "assume" with all its implications.

We concur with and reemphasize the conclusion of Herkymouse. Pilot familiarization with the point of intended landing and the proper voice communications cannot be overemphasized. Remember, when dealing with controllers, be specific, concise, and strive for mutual understanding.

A barricade arrestment is a

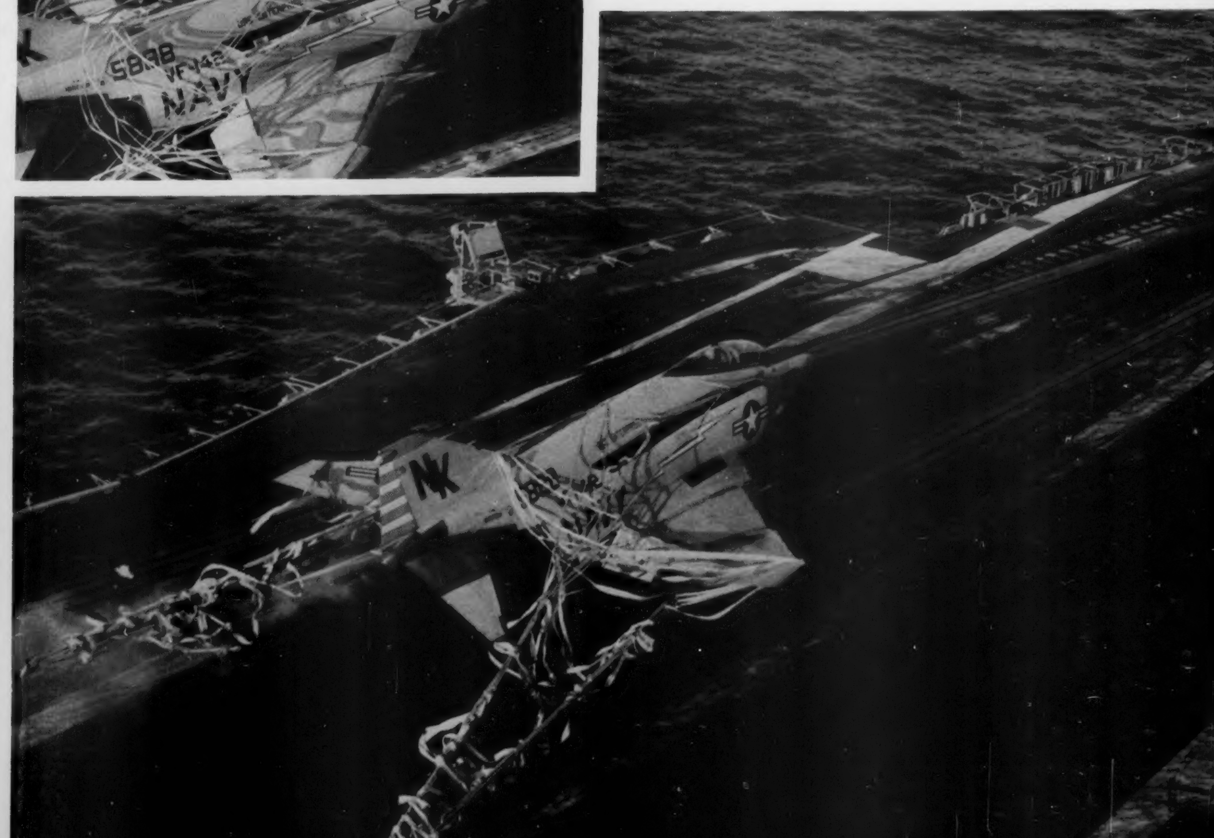
GOAL LINE S

STAND

requiring a full team effort

Shortly after catapulting from USS ENTERPRISE, CDR Thomas E. Bruyere, CO VF-142, learned that the left wheel of his F-4J had separated from the strut. After consultation between the pilot, ship and air wing, it was decided to land the aircraft in the barricade. The photos tell the story of the ensuing action.

In the words of the air wing commander: "A successful barricade engagement requires complete teamwork between the ship, air department, LSO and the pilot. It is evident that the professional approach to this mishap, the sound decisions and the near flawless execution saved an aircraft and crew."



The Case for the FDR/CPL System*

* Flight Data Recorder System/Crash Position Locator

Down in the high country: Where? and Why?

While the reasons for utilizing every available resource to locate downed aircrew and passengers are readily apparent, it is perhaps not as obvious why it is of equal or possibly greater importance to locate the wreckage or crash site even when there are no survivors. The loss of lives and aircraft due to a single accident is a disaster at best, but when nothing is recovered to determine the cause, and thus prevent a recurrence, it becomes a tragedy. Without a source of clues that may be provided by the recovered wreckage, survivors, witnesses, or an FDR (flight data recorder), the accident investigator must flounder in a morass of uncertainties, trying desperately to conjecture the cause and prevent a recurrence.

Even in cases when SAR locates a crash site, the accident investigator may be faced with a near impossible task due to extensive damage and lack of witnesses. The loss of an aircraft over water usually means the loss of almost all clues, even though the point of water impact may be relatively well defined. Our present limited ability to rapidly locate and rescue crash victims and conclusively determine the cause of aircraft accidents is unacceptable in terms of lost aircraft and human resources.

The FDR/CPL System

There is a family of devices on the market and under development which promises to aid substantially in reducing SAR costs and to help determine the causes of an accident. The best known of these devices is an ejectable package containing an FDR and a CPL (crash position locator). Presently being installed in Navy P-3B, E-2B, and C-2 aircraft, the FDR records key flight data. Typically, this includes a 30-minute (erase while record) continuous record of: all cockpit communications; airspeed, heading, and altitude; aileron, rudder, and elevator positions; RPM and torque of each engine; throttle and stick positions; autopilot condition; and many other items. These data can be used by accident investigators to determine cause factors.

In April 1972, CNO established a policy for the incorporation of an FDR/CPL in all new naval aircraft designs. In June 1972 the requirement for an FDR/CPL was included in the General Aircraft Specification (SD-24K), ensuring an automatic review for new aircraft design.

Although U.S. commercial air carriers are required to have an FDR installed and operating, it is typically mounted in a "survivable" steel container inside the airframe. This normally requires accident investigators to dig through ashes at a crash site to recover the recorder. If the crash impact is extreme, to the point of disintegration, or if the aircraft crashes at sea, the recorded data is lost. Such problems can be largely overcome by an ejectable FDR.

The CPL, in its simplest form, is a radio beacon designed to guide searchers to the scene of a crash, thereby enhancing chances of occupant survival. Designers have developed an ejectable package for the CPL with an airfoil-shaped outer surface that produces lift (see Fig. 1). When released upon impact, the airfoil's properties of lift and drag carry it safely away from the crash area and decelerate the payload to a safe landing speed. In the present design, the CPL and FDR are combined in one package. This enhances the survivability of the data on the recorder, particularly in those cases where the crash occurs at sea. The FDR/CPL package is designed to float in water and remain on the

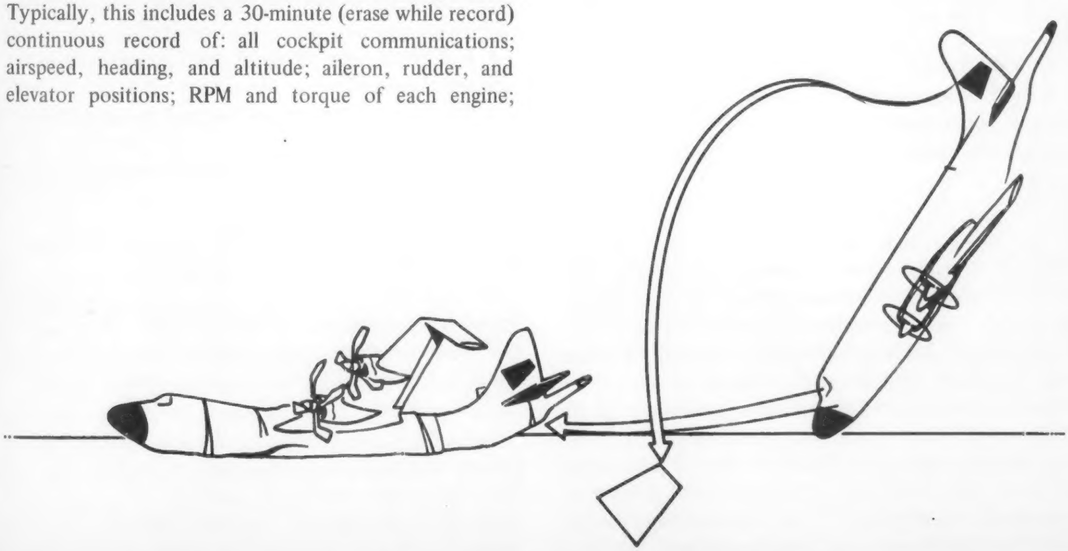


Fig. 1. Aerodynamic forces carry ejectable FDR/CPL package clear of aircraft in the event of a crash.

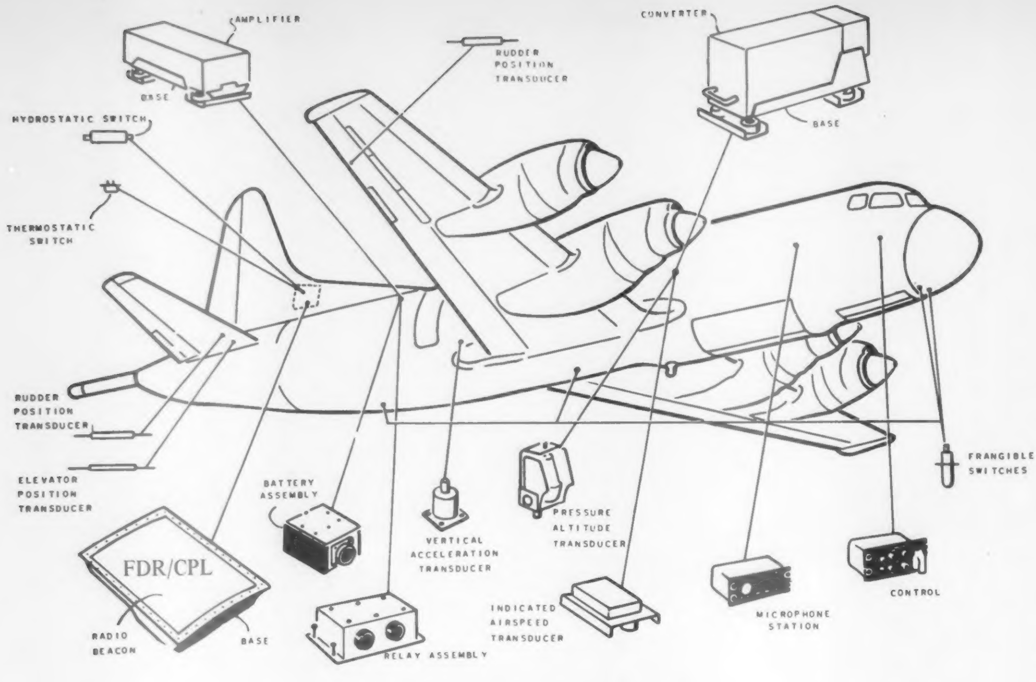


Fig. 2. Details of P-3B FDR/CPL installation.

surface of slush, or swamps.

In addition to the FDR/CPL, another device bears mention – the acoustic pinger. In the event of a crash, this rugged sonic transmitter stays with the aircraft. Sonar-equipped ships and submersible vehicles can home in on it. This could be important following a crash at sea, even of a CPL-equipped aircraft. True, the CPL would be ejected and stay on the surface, thereby indicating the general location of the wreckage. But the acoustic pinger could be used to pinpoint the exact final resting place of the wreckage for salvage purposes.

Uses of Equipment

We have already mentioned two uses of the FDR/CPL, i.e., location of survivors or wreckage and determination of cause factors. There's another equally important use – prevention of future accidents by eliminating accident potential. For example, 2 years ago, an aircraft with 26 people aboard was lost. While inbound from the beach to the carrier, it disappeared 20 miles astern – apparently without warning. There was no Mayday, and no survivors were found. The debris recovered didn't tell much – bits and pieces of clothing, one liquid oxygen converter, several fragments of wing trailing edge, and sections of interior paneling.

Strong presumptions about the accident cause resulted in an expensive change to engine truss mounts . . . a 1.4 million dollar ECP (engineering change proposal) based on the presumption that one engine disintegrated and possibly separated from the airframe. Questions which might be asked about this accident include:

- Was there any advanced warning of system or component failure?
- Did loss of power or control precipitate the mishap?
- Was recovery from the terminal evolution possible using known procedures?
- Did the force field (accelerations) at the pilot's station impede or prevent corrective action?

If answers to these questions had been available – supplied by a recoverable FDR – there would have been more than mere presumptive information upon which to base an ECP.

Growth Potential

The growth potential for this family of devices far exceeds the direct uses discussed. Typically, tape in Navy flight data recorders, designed to be used for postcrash investigation, contains the previous 30 minutes of data, utilizing an erase-while-recording feature. The system, however, is expandable. For

example, a parallel tape recorder can be installed that is capable of recording many hours of uninterrupted data. This total history can be recovered from the parallel unit after each flight and used for a variety of purposes. Postflight maintenance is one area where it is expected to be especially beneficial. In addition, the system has a potential for prediction of failures based upon its capability to record inadvertent operation beyond limits.

Another potential use of the FDR tapes is to drive the human centrifuge installed at NADC (Naval Air Development Center) as a dynamic flight simulator. By incorporating certain flight parameters on the tape, it is possible to duplicate the airplane's flight profile with remarkable fidelity. For example, the role of acceleration forces at the pilot's station rarely has been identified as a causal factor in accidents. We need to know whether the pilot was physically able to maintain control of his airplane. By dynamically duplicating the force field, a whole new dimension will be available for accident analysis. This kind of dynamic simulation – using actual flight data tapes to drive the centrifuge – is not original. In fact, the F-4 spin program recently run on the human centrifuge at NADC utilized flight test data from the Naval Air Test Center. But using dynamic data from an FDR for crash analysis has no precedent.

This kind of accident analysis will be of tremendous value to the Navy. But such accident investigation is not the end of the FDR story. Having learned more about the causes of accidents, and perhaps developed new techniques for dealing with emergency conditions, this knowledge could then be turned back into training.

The centrifuge – driven by FDR tapes – could also be used as a tool for specialized pilot training . . . not for Pensacola so much as for students of higher skill levels and experience. For instance, some flying qualities cannot be demonstrated except at the risk of losing an aircraft. The loss of an EA-6B undergoing spin tests at NATC is an example. These hazardous evolutions could be demonstrated rapidly, to a number of pilots, at low cost, and without risking aircraft or lives, through use of the centrifuge as a dynamic flight simulator.

Navy Policy

A CNO message in April 1972 established a general policy for incorporation of a FDR/CPL system in all new aircraft designs. Deviation from this policy will be by specific CNO waiver. New procurement aircraft which have progressed beyond the design stage are also considered desirable prospects for FDR/CPL installation. Additionally, NAVSAFECEN has recommended that the FDR/CPL system be installed in all RDT&E aircraft and that sufficient funding be provided to ensure development of the system for future Fleet installation.

Current Navy Programs

A program currently exists to install FDR/CPL systems in P-3B aircraft. Installations for C-2 and E-2 aircraft are in final stages of evaluation. These programs incorporate a system which features a radio beacon CPL and an FDR mounted in a common package. This package is designed to detach itself when the aircraft crashes. The beacon permits homing directly to the crash site and rapid recovery of the FDR. Details of the P-3B installation are shown in Figure 2.

In addition, acoustic pingers are being procured for installation in RDT&E aircraft. A proposal to install pingers in all Navy aircıaft is under consideration by CNO.

Immediate cost savings will be realized. For instance, location of a pinger-equipped F-14 that crashed in Chesapeake Bay recently was accomplished in one hour at negligible costs. Two years ago, loss of an F-8 in the same area – but not equipped with a pinger – resulted in a futile search that cost the Navy three weeks and $35,000 – and no lessons learned.

Summary

In summary, the FDR/CPL system offers direct benefits in:

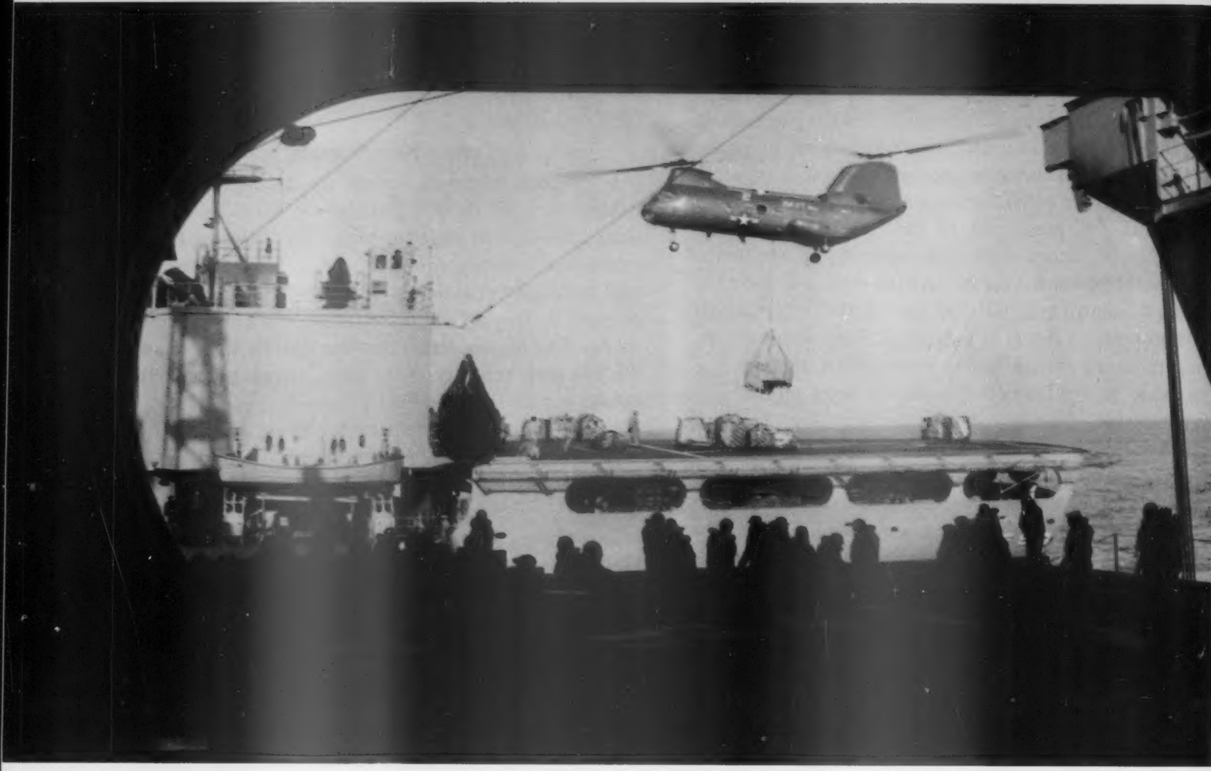
- Early location of crash sites and rescue of survivors.
- A reduction in time and money for SAR.
- A reduction in time and money for postaccident investigation.
- Prevention of future accidents by eliminating cause factors discovered during investigation.

In addition, the system could become an important tool for training and maintenance management. Ultimately, it has a capability to:

- Be used in flight training.
- Minimize maintenance costs.
- Reduce the amount of unscheduled maintenance and unwarranted hardware removal.
- Increase aircraft utilization rate.

Altogether, the FDR/CPL system has important applications in naval aviation from the standpoint of safety, training, maintenance management, and economy. Its application to passenger carrying, patrol, training, solo mission, and RDT&E aircraft is a matter of first priority.

(The assistance of CDR W. R. Crawford, MC, USN, Naval Air Test Center, Patuxent River, Md., in the preparation of this article is gratefully acknowledged.)



Have you ever wondered what goes through the mind of a VERTREP pilot during replenishment operations? Most of the thoughts pertain to *your* safety and how well your ship complies with SOP to ensure hour after hour of safe, successful operations.

VERTREP Reflections

By LT Dick Carver, HC-3

VERTREP has been the reason, more than any other, that the U.S. Navy has made tremendous strides in sea mobility and combat readiness. By VERTREP, the lines of normal support have been extended, allowing sustained operations for long periods of time.

With the increased support capabilities, however, the Fleet accepts additional hazards that are out of the ordinary to older ways of UNREP. For example, bad weather and darkness (within reason) no longer prohibit VERTREP operations. Such conditions would have necessitated termination 15 to 20 years ago. The Navy has developed a highly sophisticated set of safety precautions and equipment for safe and efficient VERTREP.

The Boeing-Vertol H-46 has made possible a whole new set of rules and new parameters to the supply scene. This tandem rotor, twin-turbine helicopter, with a maximum external capacity of 8000 pounds, is responsible for a quantum jump in UNREP capability.

Its capacity, a crew of 4 and 20 fully loaded troops, adds to its attractiveness for uses other than VERTREP.

The H-46 is also capable of lifting light, external cargo or personnel by means of a winch assembly in the aircraft. This hoist has a capacity of 600 pounds and can be used from the forward personnel door, through the center deck hatch (normally used for the cargo hook), or through the aft cargo ramp.

Several important considerations directly affect VERTREP ops both from the standpoint of the delivery ship and the receiving ship. (The two source documents, NWP 38 and NWP 42, address the subject of UNREP/VERTREP, and everyone involved should know the contents – particularly the lists and SOP for personnel safety, protective equipment, and operational requirements.)

Prudential Rules

For safety of flight crews and deck personnel, we must consider a wide range of precautions.

- The briefing officer should ensure that each man assigned to work beneath the helicopter understands the dangers of blowing debris and unstable loads. Additionally, workers must remember that rotor blades generate near hurricane-force winds and lots of static electricity. Hoist cables and cargo hooks must be grounded using special grounding gloves or rods to prevent electrical shock.

- NEVER, ever attach the hoist cable or cargo pendants and beckets to any part of the ship. In the event of engine failure or control malfunction, the pilot must be free to depart hover into forward flight or into the water alongside, and the cable must be free to leave with the helicopter.
- Personnel transfers are usually conducted quickly, and workers below the helicopter are not exposed too long to the dangers. VERTREP operations, on the other hand, require men to work below the aircraft for longer periods. Supervisors must provide rest periods for these men. The physical drain is heavy on cargo handlers rigging loads for pickup. They are constantly being blown off balance and occasionally blown down. Men have even been blown over the side.
- All hands involved in moving cargo must be alert to anything which can FOD the helicopter – light pallets, pieces of sheet metal, loose clothing, paper, trash, etc.

Sightseers, amateur cameramen, and off-duty personnel should be cleared at the first sign of their presence anywhere near the operating area – the fewer people in the immediate area, the less chance of FOD, the less chance of injury, and the less chance of onlookers getting in the way of necessary work.

Probably the single, most dangerous aspect of VERTREP is the load itself. Sure, it looks as if the ease with which the helo cargo hook is moving the load around that one should try to steady it if it starts swinging. Anyone standing on a forklift, under a load, or on top of a gun mount, or any other place trying to steady a load, however, is just asking for trouble.

Continued

Steadying a 3 to 4-ton load is *impossible!* Let 'er go! If the helicopter pilot can't control it, he'll do one of two things – set it back on deck if he thinks he can do it safely, or he'll dump it in the ocean out of harm's way.

• VERTREP equipment provided to ships is subjected to demanding tasks and usually under less than desirable conditions. Mk-85 and -105 pendants and beckets should be carefully inspected before use. Any evidence of fraying, looseness, or excessive wear is sufficient to relegate them to the repair pile, *not for use*. They are covered under the MRC system, where information concerning inspection, cleanliness, and upkeep is found.

Chain tiedowns for helicopters on ships with helo detachments are of particular concern because of salt air exposure. Repair kits for tiedowns are available from the Aviation Supply Office (FSN 1RM 1730 777 0234 SX).

• Night VERTREP is yet another ballgame. Reduced visibility (lights and shadows) increases the hazards to rotor blades from superstructure, antennas, and gun mounts that are easily avoided during daytime ops. It is very important that ships engaged in night VERTREP lower or remove all possible obstacles in the drop or pickup areas. Deck lights should be bright, and all hands should be cautioned to avoid shining any kind of light directly at the helicopter. The use of photo flashbulbs is prohibited. The pilot is busy enough without night blindness adding to his problems.

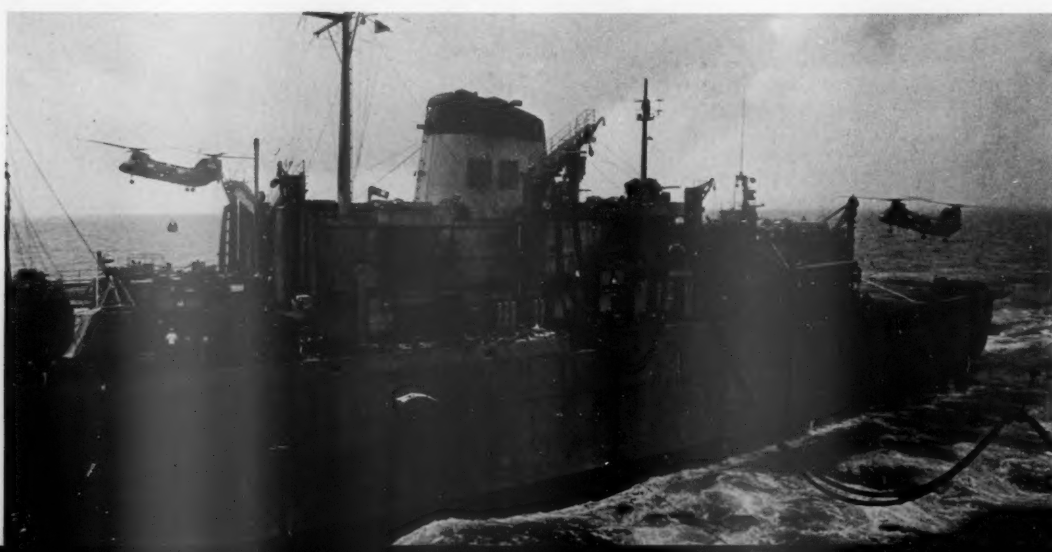
The tempo of operations should be reduced at night and supervisors should remember the limitations of their workers and the pilots. Weather conditions, sea state, and lighting may further reduce pilot capability. The helo detachment OIC or the pilot should be consulted concerning existing conditions – (both NWP 38 and 42 emphasize the requirement to consult the pilot). Night VERTREP of DLGs, DEs, and other nonaviation ships is viewed as questionable in NWP 38. Even though a ship may be certified for night VERTREP, a combination of operating conditions may make night operations imprudent. Pilot responsibilities are listed in OPNAVINST 3710.7, and he cannot be relieved of them.

Communications on the VERTREP net should be carefully controlled – especially last-minute supply requirements while helicopter control is going on. Pilots hovering or approaching to hover are distracted by needless chatter on the radio at a time when they can least afford to be distracted. The optimum is a quiet VERTREP net.

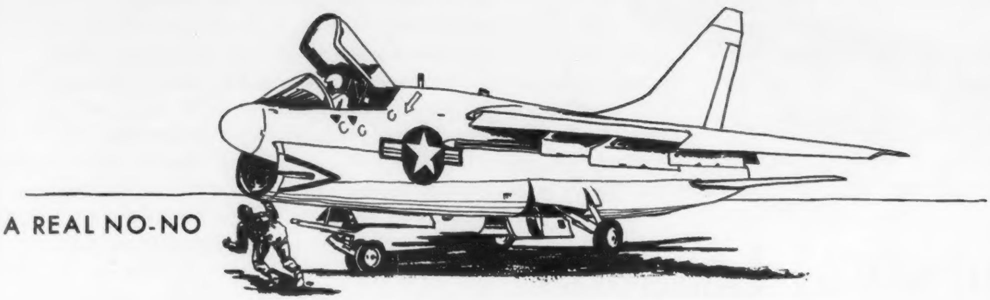
Careful coordination between the LSE and pilot is mandatory. The pilot is simultaneously listening to directions from his crewman and his copilot, following hand or wand signals from the LSE, and making his own observations. The LSE must be in position to maintain eyeball contact with the pilot at all times and also ensure that the helicopter is clear of and not drifting toward obstructions.

Summary

In a nutshell, a healthy respect for the size as well as the capabilities and limitations of the H-46 is necessary. Ships' crews must maintain nonskid decks, lighting, communications, cargo and hoisting equipment, and safety equipment in top operating condition to ensure safe delivery of supplies at sea. Eliminate loose objects from the operating arena, and cut unnecessary radio chatter. All of these will enable the pilot to concentrate on his job – which he enjoys performing. One pilot remarked, "I enjoy my job, and given a choice, I wouldn't be any place else. You are the reason I went to sea, and all that flight time would be wasted with nothing to deliver." ◄



A-7 Intake Hazards



AN ANYMOUSE report was received recently which reiterated the hazards of the A-7 intake to personnel on deck. The report concludes with a warning to all those who work on and around the A-7. Read on:

"The first day back on the line for our CVA, after a long rest of about 3 weeks, I saw what should be a warning to all who work around the *Corsair II*. The first launch had just returned to the ship, and all the flight leaders were anxious to reach Air Intelligence to complete their debriefs.

"Our executive officer was one of these flight leaders, and coming from forward where his aircraft had been parked, he discovered another A-7 between him and the island. Because the intake was located behind another still-turning aircraft (which would make it very hard to go around the intake at the appropriate safe distance), he promptly made the decision to go under the aircraft in his line of travel.

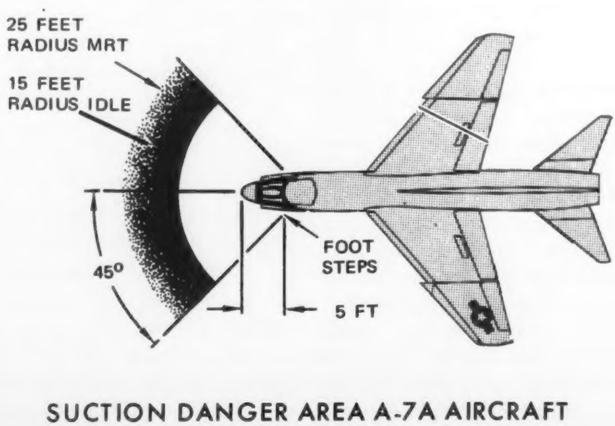
"So far, I don't question the XO's decision one bit. But his next move almost floored me, *he went under* the aircraft that was in his way by ducking under the intake just *in front of the launch bar!* Now, it is my understanding that this is regarded as a very poor practice that can result in some very messy and costly consequences.

"I've been after each person I have observed doing this because of the danger, but how are we safety petty officers supposed to explain it when the XO commits the no-no?

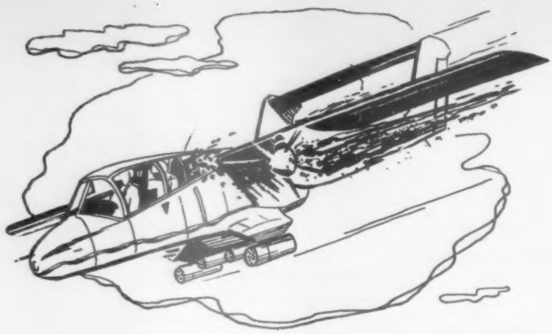
"This practice should cease unless those concerned want to take that nightmarish ride down the intake of an A-7."

Safety PO Mouse

Keep laying it on them. It's a real bum trip down that intake.



SUCTION DANGER AREA A-7A AIRCRAFT



Survival Lessons

WHEN an Air Force OV-10 took a near-direct hit from a surface-to-air missile, the pilot and his Marine Corps observer in the back seat found that damage to the rearseat parachute made ditching preferable to ejection. The observer's survival story has some good lessons.

The two-man crew took off in mid-afternoon. After working several air strikes in the assigned area, the pilot began strafing a target in support of troops in contact. Five strafing passes later, there was a loud explosion from the area of the left engine. The OV-10 had taken a hit from a surface-to-air missile.

While operation of aircraft systems was being checked out, the pilot headed feet wet. At this time, the observer found that there was a hole in the left fuselage behind the rear seat with pieces of parachute material protruding through it.

In preparation for ditching, the pilot jettisoned external stores, and the two men carried out preditch emergency procedures.

On initial impact with the water, the aircraft skidded left, flipped two or three times, and came to rest inverted, nose-down.

Prior to ditching, both crewmembers had released their seat kits in an attempt to prevent possible entanglement. *(This would leave them without their rafts. – Ed.)* The observer in the rear seat opened his lap belt and released his upper Koch fittings. At first, his left upper Koch did not release, so he half-turned, faced the seat, and in this position was able to open it successfully. He then exited through one of the side canopies.

Because of the inverted attitude of the aircraft under water, he was disoriented and at first had trouble deciding which way was up. He tried to inflate his LPU-3/P life preserver (Air Force waterwings), but was unable to do so. (He said later that he might not have pulled the right cords.) He swam to the surface.

After surfacing, the observer took off his helmet, held on to the tail boom of the aircraft, and looked around for the pilot. There was no sign of the pilot on the surface, nor could the observer locate him by searching under water. (*The pilot was not recovered. – Ed.*) As the aircraft began to sink, he located and pulled the actuator cords for his LPU, which inflated with no problem.

When a fully inflated LRU-3/P liferaft floated to the surface, the observer climbed in. After settling in the raft, he tried unsuccessfully to make initial contact with airborne aircraft on one of his Air Force URC-64 survival radios. After re-reading the instructions, he decided the radio was inoperative and threw it away. He made contact on the second radio without difficulty. At this point, the liferaft began to sink as the aircraft submerged. Quickly, he cut the cord which was apparently connecting his raft to the wreckage.

When a CH-46 helicopter arrived, the survivor punctured his raft to sink it. He found the horsecollar difficult to enter initially – couldn't remember how to use it and got in backwards. Realizing his mistake, he re-entered the sling properly.

Here are the life support "problem areas" indicated by Air Force investigators:

- Immediately after escaping from the ditched aircraft and surfacing, the observer removed his helmet. In doing so, he lost his head protection during helicopter pickup. He also states that he had difficulty using the horsecollar when the helicopter was overhead and that he would not have had this trouble if he had kept his helmet on and put the visor down. *(Presumably, this refers to rotor wash. – Ed.)*
- The observer seems to have been unfamiliar with the location and operation of his life preserver. Increased familiarity with this equipment would have shortened his time under water.
- When his survival radio malfunctioned, he threw the unit away. This action denied life support technicians the opportunity to inspect the faulty radio and determine corrective action.
- As he left his LRU-3/P liferaft, he punctured the raft and sank it. The survivor need only swim away from the raft, leaving the raft intact for further use in the event the rescue mission is aborted for any reason.

Life support investigators recommend that all aircrews be reindoctrinated during egress training on:

- Importance of retaining the helmet.
- Location and operation of the LPU-3/P life preserver unit.
- Correct use and entry into the horsecollar type sling commonly used in helicopter pickups.
- Correct procedures when leaving the liferaft and preparing for pickup.

notes from your flight surgeon

Recall

"I WAS surprised at how procedures from water training in flight school came back to me. When I first realized we were under water, I didn't panic and was waiting for bubbles to clear before I got out."

Helo copilot after ditching

Right and Wrong

"A GOOD example of the things that can go right and wrong when it comes to aircrew in a survival situation . . ."

That's the way the investigating flight surgeon describes an F-4 ejection.

The student pilot deployed his RSSK seatpan, inflating his raft. When he hit the water, he released his Koch fittings and boarded his raft easily. His dye marker was quickly spotted by the crew of an orbiting aircraft.

At the approach of the rescue helo, the student pilot set off a smoke flare to show wind direction. He climbed out of his raft and facilitated the rescue.

The instructor RIO, however, had several problems.

On parachute descent, he could not deploy his seatpan survival kit. He let it go because he thought it would pull him under water.

Because he had discarded his seatpan, the instructor lost his raft, URT-13, and radio beacon. He could not reach his signal flares or pencil flares because his inflated Mk-3C life preserver was in the way.

After floating 28 minutes or so in the water, he was rescued – very cold and with leg cramps. At the time of rescue, water temperature was 54°F. Air temperature was 59°F.

The flight surgeon states that this squadron is one of the few jet squadrons in the area that "persists in wearing antiexposure suits." However, neither man was wearing one on this flight because the air-water temperature at the time was borderline.

It's Happened Again

THE FOLLOWING item first appeared in the 9-15 Aug 70 Weekly Summary. Another pilot fatality has occurred for the same reason. Please read and heed.

The Navy very recently lost another pilot after an apparently "successful" ejection. Cause of fatality: initial reports indicate the pilot failed to connect the upper Koch fittings to the torso harness.

Aircrewmen are faced with many varying situations when preparing for a launch. This is particularly true when away from established squadron procedures on a cross-country flight. It is all too easy to become entrapped by situations such as not securing fittings that normally would be checked by the plane captain.

Let's learn from these lessons.

Vertebral Injuries

BECAUSE he hunched forward when he pulled the seatpan firing handle, an A-7 pilot suffered major spinal injuries on ejection.

"The vertebral compression fractures the pilot received," the investigating flight surgeon states, "are commonly associated with poor body positioning prior to ejection. These fractures can usually be prevented if you consciously place your head and back against the seat before you pull the handle."

Frequent ejection seat drills at squadron level, properly supervised, can help you assume proper body position when you initiate ejection by either the face curtain *or* seatpan handle. *Practice and practice and then practice again.*

Watch Those Hands!

"KEEP your hands to yourself" is sometimes very good advice – especially when it comes to aircraft canopies. Ask the RIO we're going to tell you about.

The two-man crew was manning an F-4J during a rain shower. The pilot had entered the front cockpit. The RIO was entering the rear cockpit. As was his habit while lowering himself, he put his hands between the edge of the front cockpit and the canopy bow.

To keep the rain from draining into com/nav consoles, the pilot, who could not see the RIO's hands, closed the front canopy. When the canopy began to close, the RIO's fingers were trapped.

"Initial closing pressures were minimal," the squadron report states. "Vocal urgings by the RIO caused the pilot to open the canopy before it reached the fully down-and-locked position."

(We just bet they did! – Ed.)

Lowering canopies to prevent moisture damage is standard practice. Putting your hands where they can be injured is not.

As the squadron report stated, "You must continually review your own habit patterns to see that you don't develop unsafe procedures in your daily actions."

Remember, around aircraft canopies, keep your hands to yourself.

Can Do!

A "can-do" attitude per se is valid and part of our naval heritage. However, a blind "can-do" spirit can and has been the precursor of accidents.

RE: the back cover of your October issue showing an E-2 in the water with the zig-zag caption "Can Do," I should like to take exception to the presentation on two grounds.

First, I feel it is inappropriate to present a picture of this sort, with its implied meaning, on the rear cover. Had the picture accompanied or referred to an article on the E-2, illustrating a safety hazard caused by a "can do" attitude, it might have been appropriate. Presented as it was, it implies that the E-2 is plagued by Mr. Willard's assessment of the community's attitude as a whole which, incidentally, I do not think is valid.

More important than the manner in which the picture was presented is my supposition that it is a "can't do" philosophy which continues to permeate the aviation community when it comes to safety fixes for the E-2 ("can't do" from the standpoint of funds for implementation of recommended safety changes and a resistance by those with the authority to implement changes to do so).

In the past fiscal year, two E-2Bs have gone into the water with a loss of life and equipment. The first due to a midair, and the second due to a control failure. Had a rapid egress system or an alternate control system been available, lives would have been saved.

I am told the Navy "can't do" in either case due to the impracticality of ejection seats for the E-2 and likewise for the alternate control system. Obviously, the prominent radar dome above the fuselage presents one

obstacle to ejection seats, but is it insurmountable? Why not a pyrotechnic device to blow it off similar to the one proposed to blow the rotors off helicopters prior to ejection of their crew? Is there a carrier based, fixed-wing aircraft being built today, other than the E-2, that does not have ejection seats?

How about that alternate control system? The E-2's controls are totally hydraulic. If something goes wrong with the system (whether it be an A-7 slicing off the outer portion of the wing or a failure of a control component), there is no manual backup. The airplane is going to go down with a potential loss of five lives. An intensive study by the Air Force in fly-by-wire primary flight control systems (*Aviation Week & Space Technology*, Oct 16th issue) could have spin-offs which could be applied to the E-2 in future production. Survivability would be provided in any case of hydraulic failure.

Funds are appropriated for improving the E-2's weapon system. New aircraft are coming off the assembly line today. There never seems to be any money left over for total crew survivability? Truly, it is this "can't do" attitude that is more of a safety hazard for the E-2 crew than Mr. Willard's assessment of "can do."

LCDR Michael K. Ungerman, USN

• First, yours is not the only feedback we've received on the October back cover. Our E-2/C-2 analyst has also received comments indicating that the picture/caption did not properly communicate what was intended: A "can-do" attitude per se is valid and part of our naval heritage. However, a blind "can-do" spirit can and has been the precursor of accidents. The message was Navywide in scope and included higher command; any type aircraft could have been used to illustrate the point. No other meaning was intended.

Perhaps the E-2 was a poor choice at the moment to illustrate a bird lost by "can do," but the blind "can do" spirit has accounted for many such aircraft strikes. No naval aviation community is exempt from this particular hazard. However it should be noted that the E-2 *estimated* accident rate for the past year – through December 1972 – is 0.89 which compares very favorably with the rates of other Navy carrier aircraft.

With regard to the two specific instances where E-2s have gone into the water during the past year because of a midair and a suspected control failure, we share your concern regarding rapid egress capability. The C-2A is equally susceptible to catastrophic loss of life under the same set of circumstances.

During the past year, there have been one C-2A and two E-2C system safety review conferences sponsored by NAVAIRSYSCOM in which a Safety Center analyst was in attendance. Liaison with NAVAIRSYSCOM class desk continues in order to identify areas of greatest safety potential. Below is a synopsis of the status of various system change proposals which might be beneficial in the improvement of survivability during the emergencies to which you have alluded:

Problem: Loss of both hydraulic systems in flight.

Recommend: At E-2C conferences in May and September 72, it was recommended that independent emergency trim motors that actuate trim tabs on three axes using battery power be incorporated or consider a third chance system.

Results: Redesigned wing swivels will be installed on the E-2C and evaluated for retrofit on all E-2/C-2 aircraft, and the hydraulically operated windshield wipers have been redesigned to be operated from either of the present hydraulic systems. Grumman Aerospace Corporation has been requested to submit a proposal on an alternate flight control system. The NAVAIRSYSCOM E-2/C-2 class desk has not yet received the GAC proposal, but hopefully will be able to start review in the near future. Best information available is that GAC is working on a whole matrix of possible approaches including "fly-by-wire," "fly-by-cable," electrical operation of trim tabs from a third electrical source, a third hydraulic system, and various combinations. A related interim proposal being prepared by Grumman is the replacement of presently installed bolts with "fail-safe" self-retaining bolts on all three axes of the flight control systems in those areas that are subject to maintenance. These items could be installed in all E-2/C-2 aircraft.

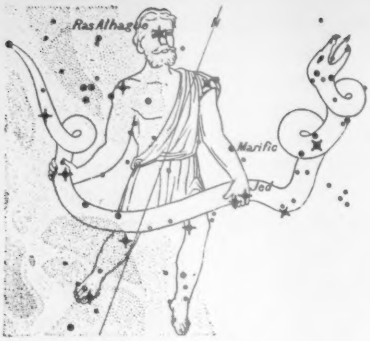
Problem: Need for rapid egress system for use in bailout or water ditching situation.

Recommend: Incorporate a pyrotechnic system that provides an enlarged egress port in fuselage and pilot's overhead area which could be instantaneously activated.

Results: Tracks and fittings around pilots' overhead hatches are being improved on all aircraft by E-2, AFC 162 and C-2, AFC 76. Incorporation of a pyrotechnic explosive device is under consideration, but probably will not be identified for funding for some time in the future. There are no current plans to install ejection/extraction seats in the E-2/C-2 airframe.

As you probably know, a significant portion of funds available has been identified for the new E-2/C-2 propeller procurement program. The earlier decision to purchase new props for the Hummer and Super COD community seems justified based on data gained from the just-completed Grumman flight test program on a highly instrumented bailed Navy aircraft.

APPROACH hopes this will answer your questions and assure the community that solutions are being pursued. Progress reports will be printed periodically.



Ophiuchus and Serpent.

Letters

Anger is just one letter short of danger.

Will Rogers

Helo Placards

FPO, New York – The high noise level in helicopters, with engines burning and rotor blades turning, makes briefing of passengers difficult. Why not mount ditching procedures on the bulkhead or door of the helo (H-3) in the passenger compartment?

We have mounted ditching instructions in our HH-2Ds on a piece of laminated posterboard beneath the window of the cargo door directly across from the passenger seats. In the H-46 or H-3, several of these placards could be mounted at appropriate intervals along the interior bulkheads. They would be reliable backups for the pilot's or crewchief's briefing.

It is recommended that the instructions include the following as a minimum:

- Locate emergency exits.
- Fasten safety belts.
- Brace for ditching.
- Exit helo ONLY after blades stop (or break off) and all motion ceases.
- Inflate life preserver only when clear of the helicopter.
- Remain together and stay calm.

LT G. I. Peterson
HSL-30, Det 31

• The subject of helicopter passenger briefings has been on front burner for the past few months. Model managers are hard at work preparing NATOPS passenger briefing guides. Also, a briefing booklet similar to the old *Sense* pamphlets is in the mill here at the Center.

> APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request.
>
> Address: APPROACH Editor, Naval Safety Center, NAS Norfolk, Va. 23511. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

Standard Issue Flight Helmet

Fightertown, U.S.A. – In my opinion, the standard issue flight helmet with the double visor is extremely bulky and heavy. It is totally unsatisfactory for flight in any situation other than straight and level flight. Whoever evaluated this helmet didn't fly very much ACM with 6G on the aircraft.

Why not authorize form-fit, single visor helmets for fighter and attack pilots . . . right now! Or authorize the old leather flying cover used in World War I or a modern version of it.

I've had 200 hours of flight time in the last 10 months, and every single hour of this in the ACM environment was wasted because of complete lack of rearward visibility and upper body movement. The helmet also catches on the LPA, a mandatory item of flight equipment.

Exasperatedmouse

• Let us bring you up to date!

Change 3 to NAVAIR 13-1-6.7, Aircrew Personal Equipment Manual, authorized the use of the single visor on APH-6C helmets at your commanding officer's discretion. Commander, NAVAIRSYSCOM letter AIR-5311J/1096:PA of 15 Dec 71 established the APH-6D helmet with single visor as standard item of supply and the APH-6C with dual visor as limited standard.

An interim lightweight form-fit version is currently being evaluated by selected VF aircrewmen.

The unofficial word is that earphone problems plague this new design. Looks as if fleet-wide distribution to you fighter jocks is still a ways down the tunnel.

Sorry we can't provide a target date at this time.

Vertigo

MCAS, New River – We were engaged in a section SAR, in our H-46s, looking for a downed A-6 and its missing crew. The crash had occurred several days before in an area of swamps and marshes.

We searched all day, and as darkness approached, we informed the leader of the patrol boats working with us that we were returning to the boat docks and would wait for them. After landing and securing the aircraft, we got out to stretch our legs. We knew it would take the boats about an hour to get there.

We still had a way to go to RTB, but our agreement was to ensure the boats were back before we shoved off. We waited between 45 minutes and an hour, then fired up the APP and called the boats to check on their ETA. They arrived about 15 minutes later.

We could no longer hear our gyros unwinding, so we started engines (NATOPS says wait 20 minutes) and lifted from the zone. It was necessary to go on the gages immediately. The pilot's gyro horizon showed 20 degrees nosedown, while the copilot's showed 5 degrees nosedown and 15 degrees left bank. Both pilots became affected by vertigo.

Fortunately, our wingman was in good shape, so we passed the lead and used our crew chief's instructions

concerning our attitude. After our wingman passed abeam, we flew wing on him. He was a welcome reference.

The lesson is obvious: by violating NATOPS we got in a bind. With inoperative gyros, we all could have ended up as statistics.

MAWmouse

• A gyro with bad vibes is no gyro at all. Hope your near disastrous experience makes others immune to attacks of get-home-itis. Many haven't been as lucky.

Posters Anyone?

NAS Imperial Beach – Have any of you ASOs considered organizing a safety poster contest? Most of you have entertained the thought, I'm sure, and most of you know it's encouraged in the ASO's Guide.

Despite doubts on the success of the contest, this is one contest which can't lose. If there's only one poster (idea) submitted, the contest is a success – merely because one individual thought safety and tried to "package" it attractively enough to interest others.

It took several months wondering how to get started, but our squadron tried and liked it. Once the contest was announced, it snowballed. Ideas came from all hands. Here are the guidelines we used that were helpful:

- Assemble the materials to make posters ahead of time. Have all the "makings" ready.
- Offer prizes – 72-hour passes, savings bonds, special trips – to make the contest appealing.
- Publicize the contest in the POD and base newspapers. Print the rules, judging categories, prizes, location of materials, and the deadline.
- Canvas personnel to find out who can draw. Match up the idea-men and the artists.
- Display entries as soon as they are received.
- Announce the winner and runners-up when the contest ends and prominently display the winning poster.
- Photograph all entries and mail 8 x 10 prints to NAVSAFECEN.

We canvassed the squadron and found that there was almost 100 percent participation (*Right on. – Ed.*) – not 100 percent submitted posters (that was about 10 percent) – but everyone had given the subject a great deal of thought. That was the real reward, *everyone thinking safety*.

LCDR Brian H. Shoemaker
ASO, HSL-31

• Your guidelines are outstanding, and the poster ideas your squadron came up with were great! We intend to use several as posters or as outside back covers for APPROACH (with credit line).

Several other squadrons have recently held poster contests with equally rewarding results, the most notable being *greater safety awareness.* Thanks!

Kudos From Great-Grampa P.

NAS, Miramar – I particularly appreciated seeing "Color Me Green" in the December 1972 issue of APPROACH. This sort of operation occurs all too frequently among what are supposedly "professional" aviators. Many are the accident reports I have reviewed documenting the same kind of slipshod planning, briefing, and flying of naval air missions. The last paragraph sums it up well when it states that the cause of the accident occurred perhaps several years prior. An additionally equally valid point is that the pilot himself (HAC) is only partially responsible for what happened. The "climate" in which he was operating was established and allowed to perpetuate by his commanding officer and supervisors who condoned and accepted the lackadaisical attitude which prevailed. Commanders who demand compliance with NATOPS and will not accept less than professional performance will usually get it.

Thanks for letting me blow my steam.

Former "Grampa Pettibone"

Buckle Up

FPO, San Francisco – According to OPNAVINST 3710.7F, all crewmen in an aircraft are to buckle up! This is to bring to your attention that it 'taint necessarily so.

Designated crewmen routinely instruct passengers to observe safety during takeoff, in flight, and on landings. I've noticed that they especially check the use of seatbelts. Once they pass the word, however, the crewmen themselves don't bother to buckle up. (Do as I say, not as I do. BAH!)

Such safety violations have been personally observed by me in various instances during routine MedEvac operations carried out by support squadrons. The answer I get when I question the reason for violating the safety requirements is as poor as their example.

LCDR P. Mendez, Jr., MC
CVW-21

• Since the heat is on from all directions with regard to passenger briefing nowadays, perhaps even the offending crewmen will warm up to the importance of buckling up – if for no other reason than to set an example for those passengers who may not believe such actions to be indispensable to personal survival.

Vol. 18 **approach** No. 9

RADM W. S. Nelson
Commander, Naval Safety Center
Publisher

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

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NavAir 00-75-510

Purposes and policies: APPROACH, published monthly by the Naval Safety Center, presents the most accurate information currently available on the subject of aviation accident prevention. Contents should not be considered as regulations, orders, or directives and may not be construed as incriminating under Art. 31, UCMJ.

Photos: Official Navy or as credited. Non-naval activities are requested to contact NAVSAFECEN prior to reprinting APPROACH material.

Correspondence: Contributions are welcome. The right to make editorial changes to improve the material without altering the intended meaning is reserved. Reference to commercial products does not imply Navy endorsement. Views of guest-written articles are not necessarily those of NAVSAFECEN.

Distribution: Requests for distribution changes should be directed to NAVSAFECEN, NAS, Norfolk, Va. 23511. Phone: Area Code 703, 444-1321, Att: Safety Education Dept., IF YOU ARE A PAID SUBSCRIBER, address all renewals and address changes to Division of Public Documents, Washington, D. C. 20402.

Subscriptions: Single copy $1.00; 1-year subscriptions $10.50; $2.75 additional annually for foreign mailing.

Printing: Issuance of this periodical approved in accordance with Department of the Navy Publications and Printing Regulations, NAVEXOS P-35. Library of Congress Catalog No. 57 60020.

Credits

This month's cover painting by R. G. Smith, through the courtesy of McDonnell-Douglas, commemorates the fleet arrival of the Navy's newest, the C-9B. For more on this bird check out **page 8** in this issue.

CLIMB, CONSERVE, CONFESS

AFTER 1 hour of flight, an F-4 was detached over the field of intended landing by the flight leader. The crew did not recognize their position and, with inoperative TACAN, became lost. Joinup and steer by an assisting aircraft came too late for successful landing prior to fuel starvation. The crew ejected with 300 lbs of fuel remaining, 32 miles from the field.

This mishap reaffirms the proven procedure to climb, conserve, and confess when lost. Few, if any, aviators can say they have never been at least temporarily lost. Seldom do *in extremis* situations develop, thanks to redundancy of airborne navigation equipment and supporting aircraft and surface facilities. Active assistance from the latter, however, *requires a request from the lost aircraft.*

When normal navigation is disrupted by equipment malfunction or tactical employment, know and utilize all available facilities in your operating area for reorientation. This includes *timely* lost aircraft procedures: *Climb, Conserve, Confess.*

CNAL Weekly Safety Bulletin

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